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	Group Art Unit	2177	
	Examiner Name	Ali, Mohammad	
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

William D. NORCOTT

Conf. No.: 9399

Application No.: 09/863,419

Group Art Unit: 2177

Filed: May 24, 2001

Examiner: Ali, Mohammad

Attorney Docket: 50277-1005

Client Docket: OID-2001-003-01

For: ASYNCHRONOUS CHANGE CAPTURE FOR DATA WAREHOUSING

APPEAL BRIEF

Honorable Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

This Appeal Brief is submitted in support of the Notice of Appeal dated July 19, 2004.

I. REAL PARTY IN INTEREST

Oracle International Corporation is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any related appeals and interferences.

III. STATUS OF THE CLAIMS

Claims 1 and 3-10 are pending in this appeal. Claim 2 was canceled. No claim is allowed. This appeal is therefore taken from the final rejection of claims 1 and 3-10 on March 19, 2004.

IV. STATUS OF AMENDMENTS

The amendment to claims 1-10 filed May 19, 2004 has been entered according to the Advisory Action of July 8, 2004.

V. SUMMARY OF THE INVENTION

The present invention addresses problems associated with database systems and more particularly to asynchronous change capture for data warehousing. (Specification, ¶ 3) Many businesses and other large organizations today use relational database management systems known as on-line transaction processing (OLTP) systems to execute and keep track of business transactions. The data generated and recorded in OLTP systems are valuable to most businesses, because the businesses can, for example, aggregate and analyze the data to ascertain the product sales for a particular month, forecast changing trends in product popularity and identify profitable or unprofitable product lines, or otherwise evaluate the businesses' affairs. Aggregating and analyzing this data, however, is computationally expensive and, if performed on the OLTP system itself, would decrease the performance of the OLTP system. Accordingly, it has become common for businesses with OLTP systems to set up a separate computer system, generally known as a "data warehouse," for the purpose of collecting, aggregating, and analyzing the information contained in the OLTP databases. Data warehouses can grow very large, ranging

from gigabytes to many terabytes of data (trillions of bytes). The task of moving data from its original source in OLTP systems to the data warehouse is commonly referred to as data extraction, transport, and loading (ETL). (Specification, ¶¶ 4-5)

In a typical conventional approach, database administrators generally dump the entire contents of the tables of the OLTP system into flat files, transport the flat files to a staging system, and then load the data in the flat files into the data warehouse. In this approach, the amount of data extracted, transported, and loaded is as immense as the amount of data in the OLTP system, even though only a small percentage of the data on the OLTP system is actually new. Accordingly, there has been much interest in devising ways to reduce the amount of data extracted, transported, and loaded by capturing only the changed data to the database tables of the OLTP system. (Specification, ¶ 6)

A typical approach for capturing the changed data of OLTP system database tables is to add a column to the OLTP system database tables to store a timestamp or a sequence number and conditionally extract the data that has the newest timestamps or sequence numbers. (Specification, ¶ 7)

Another approach to capturing changed data is known as “synchronous change data capture,” in which the changes are captured in the very same transaction that is updating the tables on the OLTP system. Thus, as new data arrives in the data warehouse, the changes made to one or more tables on the OLTP system are captured synchronously and stored in corresponding change tables in the data warehouse, such that for every table that is updated on the OLTP system, there is a corresponding change table that contains those changes. (Specification, ¶ 9)

Methods and systems consistent with the present invention extract the change data from the recovery logs generated by the OLTP system. During the normal course of operation, database management systems maintain a recovery log, or “redo log,” to allow users to undo transactions and to provide for recovery after a system crash. These logs can be shipped to a data warehouse on a separate computer system, where the change data stored in the recovery logs can be extracted without affecting the performance of the OLTP system (Specification, ¶ 13).

Accordingly, one aspect of the present invention involves a method and software for change data capture, in which change data is extracted from a recovery log and stored in a database object such as a change table (Specification, ¶¶ 40-43 and 46; FIG. 3, steps 307-309). The change data stored in the database object indicates what modification has been performed to a source object on the OLTP system (Specification, ¶¶ 13-14 and 32-36; FIG. 2). In various embodiments of the present invention, a database statement may be generated and executed to extract and load the change data (Specification, ¶¶ 40-43; FIG. 3, step 307). Additionally a source column may be renamed into a change column (Specification, ¶46). Further, the recovery log itself may be shipped from an OLTP system to a staging system (Specification, ¶ 38; FIG. 3, step 301).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claims 1, 3-4 and 6 are anticipated under 35 U.S.C § 102 by *Norcott* (US 5,848,405).

B. Whether claims 5 and 7-10 are obvious under 35 U.S.C. § 103 based on *Norcott* in view of *Goldring* (US 6,438,538).

VII. ARGUMENT**A. CLAIMS 1, 3-4, AND 6 ARE NOT ANTICIPATED OVER NORCOTT.**

To anticipate a patent claim, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001); *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991). A single prior art reference anticipates a patent claim if it explicitly or implicitly describes each and every limitation set forth in the patent claim. *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

1. The Examiner has failed to find a disclosure of “renaming a source column into a change column” as recited in claim 3.

Reversal of the Examiner’s rejection of dependent claim 3 as anticipated by *Norcott* is respectfully requested because the Examiner has not found the feature of “renaming a source column into a change column” as recited in the context of dependent claim 3. For example, *Norcott*, the only reference being applied to claim 3, uses the actual word “column” only once in a context that does not relate to renaming a column (col. 7:4), and the words “rename” or “renaming” do not appear at all in the *Norcott* disclosure. As such, *Norcott* presents a rather slim nail to hang this rejection upon.

According to the Examiner, however, “*Norcott* teaches renaming a source column into a change column (the server process updates a redo log to indicate the changes made to the range table. Since table has been changed columns and rows automatically changed, see col. 5, lines 54-55 and col. 7, lines 3-6, *Norcott*)” (Office Action, p.5). These passages do not discuss “renaming a source column;” rather, column 5:54-55 states that “the server process 602 also

updates a redo log 620 (step 406) to indicate the changes made to the range table.” These changes are described earlier at col. 5:35-36 as “data that identifies the new data records as the new data records,” a description that does not mention column names, much less “renaming a source column” as recited in claim 3. The passage cited at col. 7:3-6 also does not support the rejection. Although col. 7:4-5 mentions a “flag (&) appended to the table name,” such information about a table name does not relate to a column name, or the feature “renaming a source column into a change column.”

As best understood, the Examiner’s logic seems to be that because “renaming” indicates one kind of change, it can be contorted to read upon any kind of change whatsoever, whether or not that change includes a change to a column name. Yet, every word in the claim must be considered and given weight. *Apple Computer, Inc. v. Articulate Systems, Inc.*, 234 F.3d 14, 57 USPQ.2d 1057 (Fed. Cir. 2000) (explaining that the district court “cannot read the qualifier ‘help’ out the definition of ‘help access window’” of claim 2). Here, the Examiner’s attempt to read the word “naming” out of “renaming” cannot succeed.

For these reasons, the Honorable Board is invited to reverse the Examiner’s rejection of dependent claim 3.

2. The record does not support the rejection of claims 1, 3-4, and 6 for the “recovery log” and “change table” as defined in claim 1.

Reversal is also requested for the rejection of claims 1, 3-4, and 6 under 35 U.S.C. § 102 because the Examiner failed to find a single reference that shows each and every limitation of claims 1, 3-4, and 6 as arranged in the claims. *Karsten*, 242 F.3d at 1383, 58 USPQ2d at 1291. For example, independent claim 1 recites:

1. A method for change data capture, comprising the steps of:
executing a database statement to extract, from a recovery log, change data indicating at least one modification that has been performed to a source object; and
storing the change data from the recovery log in a database object other than the source object, wherein the database object includes a change table.

As best understood, the Examiner’s final Office Action of March 19, 2004 adopts a variety of different and incompatible ways of reading independent claim 1 on *Norcott*, but none of them are able to meet all the elements as they are arranged in claim 1.

For example, in the main statement of the rejection as set forth on p. 4, the Examiner seems to read the recited “source object” upon the ROWID range table 612 of *Norcott* in relation to the “executing” step (emphasis added):

executing a database statement (see col. 6, lines 54-55) to extract from a recovery log (new data for refresh processing purposes, the server process deletes [extract] the ROWID range from the ROWID range table. Updates a redo log to indicate the changes made to the range table ensures that identification of the new data can be recovered in the event of database crash, see col. 6, lines 29-31 and col. 5, lines 59-61, *Norcott*), change data indicating at least one modification that has been performed *to a source object* (updates a redo log to indicate the changes made *to the range table*, see col. 5, lines 59-60, *Norcott*)

The Examiner then goes on to explain for the wherein clause of the “storing” step, with reference to dependent claim 2, which has now been incorporated into claim 1 (p. 5, emphasis added):

Norcott teaches wherein the database object includes *a change table* (the server process updates a redo log to indicate the changes made *to the range table*, see col. 5, lines 54-55, Norcott).

However, claim 1 explicitly recites “storing the change data from the recovery log in a database object *other than* the source object, wherein the database object includes a change table.” Yet, if the recited “source object” and the “database object” both correspond to *Norcott*’s ROWID range table **612**, then the Examiner’s way of reading independent claim 1 on *Norcott* does not satisfy the “other than” limitation.

The Examiner’s response to this argument switched to reading the term “database object” upon another portion of *Norcott* (p. 2, emphasis added):

First, Applicants argue that Norcott does not teach, “storing the change data from the recovery log in a database object other than the source object.”

In response to Applicant’s arguments, the Examiner respectfully submits that in particular, Norcott teaches this limitation as *the range data including the start and end ROWID values are database objects* and updates the redo log to indicate the changes made to the range table ensures that identification of the new data can be recovered in the event of a database crash that affects the data in the ROWID range table. The start and end ROWID values are stored as a new data records, see col. 5, lines 57-63.

It therefore appears that the Examiner’s new position is that “the range data including the start and end ROWID are database objects,” but this contradicts the Examiner’s previous construction of database object to include the range table. Unless the patent otherwise provides, a claim term cannot be given a different meaning in the various claims of the same patent. *Georgia Pacific Corp. v. U.S. Gypsum Co.*, 195 F.3d 1322, 1331, 52 USPQ2d 1590, 1598 (Fed. Cir. 1999); see also *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1579, 34 USPQ2d 1673, 1679 (Fed. Cir. 1995) (holding that claim term found in different claims must be interpreted consistently); *Fonar Corp. v. Johnson & Johnson*, 821 F.2d 627, 632, 3 USPQ2d 1109, 1113 (Fed. Cir. 1987.) (holding that a term used in one claim had the same meaning in another claim).

Furthermore, even if the Examiner is correct that “the range data including the start and end ROWID are database objects,” the Examiner’s rejection still does not account for all the limitations of claim 1—such as “wherein the database object includes a change table”—and there is nothing in *Norcott* to indicate that the range data “includes” the range table.

Furthermore, the Examiner’s reading of the recited “extract” upon *Norcott*’s “deletes” at col. 6:30 with the recited “extract” is also problematic. Extracting data is not the same thing as deleting data: the former makes data more available, the latter less available. Here, the Examiner proffers an interpretation of “extract” that is more appropriate for extracting teeth in the field of dentistry than extracting data from computer database systems, but the words of a claim must be read as they would be interpreted by those of ordinary skill in the art. *In re Baker Hughes Inc.*, 215 F.3d 1297, 55 USPQ2d 1149 (Fed. Cir. 2000); *In re Morris*, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). “Although the PTO must give claims their broadest reasonable interpretation, this interpretation must be consistent with the one that those skilled in the art would reach.” *In re Cortright*, 165 F.3d 1353, 1369, 49 USPQ2d 1464, 1465 (Fed. Cir. 1999).

It should be noted that, in the rejection of independent claim 8 (final Office Action, p. 10), the Examiner has adopted a different interpretation of the recited “extract.” More specifically, the Examiner pointed to some exemplary SQL code “to identify the new records by using the ROWID range table” as `SELECT * FROM sales WHERE (ROWID>=X) AND (ROWID<=Y)`,¹ but this other way of reading “extract” is inconsistent with other recitations in the claims. For example, independent claim 1 recites “executing a database statement to extract, *from a recovery*

¹ From *Norcott*, col. 6:54-55. The version in the Examiner’s Office Action used the HTML entities `>` and `<`; equivalent to `>` and `<` respectively instead.

log, change data” and independent claim 8 recites “generating a SQL statement to extract the change data *from the recovery log*.” The Examiner’s SQL SELECT statement explicitly selects from the *sales* table, not from the redo log nor even the range table.

B. CLAIMS 5 AND 7-10 ARE NOT OBVIOUS OVER *NORCOTT* AND *GOLDRING*.

1. The addition of *Goldring* does not support the rejection of dependent claim 9 for “renaming a source column into a change column.”

The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention under any statutory provision always rests upon the Examiner. *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1451 (Fed. Cir. 1997); *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995); *In re Bell*, 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993); *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to provide a factual basis to support the obviousness conclusion. *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967); *In re Lunsford*, 357 F.2d 385, 148 USPQ 721 (CCPA 1966); *In re Freed*, 425 F.2d 785, 165 USPQ 570 (CCPA 1970).

The Honorable Board is respectfully invited to reverse the rejection of dependent claim 9 for the Examiner’s failure to provide a factual basis in support of the rejection. Dependent claim 9, which recites “at the staging system, renaming a source column into a change column,” was rejected by the Examiner using the same reasoning and passage of *Norcott* as used in the rejection of claim 3. By the same reasoning given above in section VII.A.1. against claim 3, the use of *Norcott* as the primary reference is insufficient to sustain the rejection.

The addition of *Goldring* to the rejection does not fill in the gaps left by the Examiner. *Goldring* is directed to data replication in data warehousing scenarios (Title), in which an

application table is located at a source site while an aggregation operation is performed at a different, target site (Abstract). *Goldring* details a Capture component that “captures changes made to data in tables defined as replication sources” (col. 3:11-12), in which the “captured changes are stored in staging tables” (col. 3:15-16). More specifically, *Goldring* states: “In the network environment the application table 300 is located on the same system site, preferably a source site, with a Change Data (CD) table 302 and a Unit of Work (UOW) table 304” (col. 9:22-25), which “are preferably obtained with the Capture component” (col. 9:32). However, *Goldring* gives no details as to renaming a source column into a change column.

2. Claims 5 and 7-10 are not-obvious because *Goldring* teaches against “shipping a recovery log from an on-line transaction processing (OLTP) system to a staging system.”

Obviousness rejections require some evidence in the prior art of a teaching, motivation, or suggestion to combine and modify the prior art references. See, e.g., *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001); *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 218 USPQ 769 (Fed. Cir. 1983). A prior art reference must be considered in its entirety including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

The rejection of claims 5 and 7-10 as obvious over *Norcott* in view of *Goldring* should also be reversed because the references either fail to teach or teach against the features of the

claims. For example, dependent claim 5 and independent claims 7-8 recite “shipping a recovery log from an on-line transaction processing (OLTP) system to a staging system.” Although *Norcott* does state, as the Office Action cited on p.2, that “OLTP databases typically provide a mechanism for exporting data from the database into a static file” (col. 4:23-25), this disclosure is not detailed enough to suggest the specific act of “shipping a recovery log” rather than the different operation of, e.g., selecting data from an OLTP table and storing the data in a flat file (see, e.g., “flat file” on col. 5:18).

Goldring, for its part, teaches away from this feature. *Goldring* explicitly states, “In the network environment the application table 300 is located on the *same system site*, preferably a source site, with a Change Data (CD) table 302 and a Unit of Work (UOW) table 304” (col. 9:22-25, emphasis added). Additionally, *Goldring* states, “Thus, the Apply routine is used to direct the target server to receive an aggregation of the changed rows, received from the CD table 302 and the UOW table 304” (col. 10:5-7). Thus, *Goldring* requires the CD table 302 to be on the “same system site” as the application table 300, thereby teaching against “shipping the recovery log . . . to a staging system.” Furthermore, claims 7-8 recite steps performed on the recovery log “at the staging system.”

The Examiner’s response to the argument that *Goldring* actually teaches away from the invention recited in claims 5 and 7-10 is that “Goldring cures such deficiencies by teaching the captured changes are placed in staging tables with transaction detail stored in [*sic*] separately in a unit of work table, see col. 3, lines 11-17.” The Examiner gave no response, however, to the fact that *Goldring* at col. 9:22-25 actually required these tables to be “located on the same system site” as the application table.

3. **Claims 8-10 are not-obvious because *Norcott* and *Goldring* do not show “generating a SQL statement to extract the change data from the recovery log.”**
-

Claims 8-10 are non-obvious over the applied art of record for the additional reason that the Examiner’s purported combination does not teach or suggest the features of independent claim 8. For example, claim 8 recites “generating a SQL statement to extract the change data from the recovery log,” but the SQL statement in *Norcott* cited by the Examiner at col. 6:54-55, “SELECT * FROM sales WHERE (ROWID>=X) AND (ROWID<=Y),” explicitly selects from the *sales* table, not from a recovery log.

The Examiner’s later analysis of “executing the SQL statement” then equated “extract” with “delete,” which, as argued above, cannot stand.

The Examiner offered no part of *Goldring* for this feature, and it is unclear where should such a teaching or suggestion be found in *Goldring*.

Therefore, the rejection of claims 8-10 should be reversed.

4. **Claim 5 is not-obvious because *Norcott* and *Goldring* do not show “executing a database statement to extract, from a recovery log, change data.”**
-

Pursuant to 35 U.S.C. § 112, ¶ 4, claim 5 incorporates the limitations of claim 1, which recites “executing a database statement to extract, from a recovery log, change data.” As the Examiner’s basis for rejecting claim 5 is the same as that of claim 1 over *Norcott*, the rejection of claim 5’s use of *Norcott* is deficient for the same reasons as argued above. Moreover, the Examiner offered no part of *Goldring* for this feature, and it is unclear where should such a teaching or suggestion be found in *Goldring*.

Therefore, the rejection of claim 5 should be reversed.

IX. CONCLUSION AND PRAYER FOR RELIEF

Appellant, therefore, requests the Honorable Board to reverse each of the Examiner's rejections.

Respectfully Submitted,

DITTHAVONG & CARLSON, P.C.

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CLAIMS APPENDIX

1. (Previously Presented) A method for change data capture, comprising the steps of:
executing a database statement to extract, from a recovery log, change data indicating at least one modification that has been performed to a source object; and
storing the change data from the recovery log in a database object other than the source object, wherein the database object includes a change table.
2. (Canceled)
3. (Original) A method according to claim 1, further comprising the step of:
renaming a source column into a change column.
4. (Previously Presented) A method according to claim 1, further comprising:
generating the database statement to extract the change data from the recovery log and further to store the change data in the database object.
5. (Original) A method according to claim 1, further comprising the step of:
shipping the recovery log from an on-line transaction processing (OLTP) system to a staging system.
6. (Original) A computer-readable medium bearing instructions for change data capture, said instructions arranged, when executed, to cause one or more processors to perform the steps of a method according to claim 1.

7. (Previously Presented) A method of change data capture, comprising the steps of:
shipping a recovery log from an on-line transaction processing (OLTP) system to a staging system; and
at the staging system, performing the steps of:
extracting change data from the recovery log; and
storing the change data from the recovery log in a database object, said change data indicating at least one modification that has been performed to a source object.
8. (Original) A method of change data capture, comprising the steps of:
shipping a recovery log from an on-line transaction processing (OLTP) system to a staging system; and
at the staging system, performing the steps of:
registering the recovery log with a log viewer;
generating a SQL statement to extract the change data from the recovery log; and
executing the SQL statement, thereby extracting the change data from the recovery log via the log viewer and storing the change data from the recovery log in a change table, said change data indicating at least one modification that has been performed to a source object.
9. (Original) A method according to claim 7, further comprising the step of:
at the staging system, renaming a source column into a change column.
10. (Original) A method according to claim 8, wherein the on-line transaction processing (OLTP) system and the staging system are provided by different database vendors employing a different, incompatible internal implementation.